905-11 Diastolic Ventricular Function in Pediatric Patients With Type I Diabetes Mellitus

Robert Lichtenberg, Linda Tajeh, William Jacobs, W Patrick Zeller, Thomas L. McKiernan. *Loyola University, Maywood, IL*

Diastolic Dysfunction, as assessed by Doppler echo transmitral flow velocities, is present in up to 30% of young adult diabetics without clinically evident heart disease. This "stiff" ventricle is not secondary to clinical hypertension or coronary artery disease. We postulated that the process causing cardiac autonomic neuropathy (CAN) is similar in onset to that resulting in ventricular noncompliance. Sixty three Type I diabetics (6–24 yrs) were compared to 63 sex and age matched controls. Forty five had no CAN (DM-CAN), mean age 13 and duration of diabetes 6 yrs. Eighteen had CAN (DM + CAN), mean age 20 and duration of diabetes 15 yrs. In this group were 6 patients with early CAN, mean age 17 and duration 12 yrs. No patient had clinical hypertension or hypertrophy on echo. Peak Early(E) and Late(A) diastolic filling rates, E/A ratio, and atrial filling fraction (FVI %A) were measured.

	Controls	DM-CAN	DM + CAN	DM + Early
E (cm/s)	91 ± 10	87 ± 8	64 ± 7	72 ± 4
A (cm/s)	41 ± 7	44 ± 6	66 ± 6	59 ± 4
E/A ratio	2.1 ± 0.4	2.08 ± 0.5	0.99 ± 0.2	1.22 ± 0.04
FVI% A	21 ± 5	23 ± 5	44 ± 6	35 ± 5

Conclusions: Patients with Type I DM and CAN have abnormal diastolic function. The severity of the CAN correlates with the severity of the "stiffness".

905-12 Nitroprusside Increases Cardiac cGMP and Reduces Contractility in Isoproterenol-Stimulated Rat Hearts

Richard E. Klabunde, John Sadoff, Peter M. Scholtz, Harvey R. Weiss. *Deborah Research Institute, Browns Mills, NJ; UMDNJ-Robert Wood Johnson Medical School, Piscataway, NJ*

Nitric oxide is known to stimulate guanylate cyclase and increase cGMP. Besides causing vasodilation, increases in cGMP have been shown to decrease myocardial contractility and oxygen consumption. This study was designed to evaluate the hypothesis that nitric oxide-induced increases in cGMP require elevated background cAMP to produce cardiac depression. Using isolated, Langendorff-perfused rat hearts, we determined the effects of intracoronary infusions of nitroprusside (NP; 10^{-3} and 10^{-2} M) in the absence and presence of isoproterenol (ISO; 10^{-8} M) on cardiac function, oxygen consumption, cGMP and cAMP. ISO, with and without NP, caused a significant increase in cAMP without altering cGMP. This was associated with an increase in left ventricular developed pressure from 90 ± 8 to 163 ± 19 mmHg. NP at both concentrations did not alter cAMP levels, but significantly increased cGMP (from about 4.0 to more than 30 pmol/g) in both the absence and presence of ISO. In the absence of ISO, NP increased left ventricular developed pressure from 93 ± 9 to 102 ± 13 mmHg; however, in the presence of ISO, NP decreased left ventricular developed pressure from 181 ± 212 to 157 ± 9 mmHg. Changes in oxygen consumption brought about by NP tended to parallel the changes in left ventricular developed pressure. Therefore, the cardiodepressant effects of NP were only observed against a background of inotropic stimulation with ISO. Furthermore, the effects of NP on contractility were not related to changes in cAMP.

905-13 Is Measurable Cyclic Variation of Integrated Backscatter Present in All Standard Echo-Views in Dilated Cardiomyopathies?

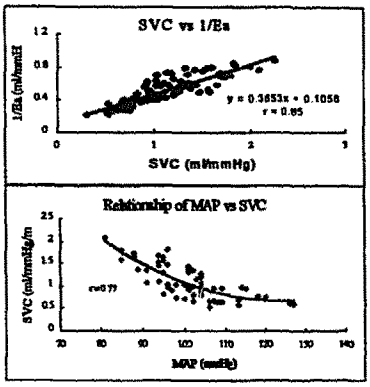
Konstantina Bouki, Aleksandra Lange, Przemyslaw Palka, Carmel M. Moran, Lynn Fenn, M. Pauliina Ramo, Thomas R.D. Shaw, W. Norman McDicken, George R. Sutherland. *University of Edinburgh, UK*

The mechanism for the reduced cardiac cycle-dependent variation of integrated backscatter (CV/IB) in dilated cardiomyopathies (DCM) is unclear. Prior measurements of CV/IB in DCM were limited to the septum (IVS) and left ventricular (LV) posterior wall imaged from the parasternal long-axis view (LX). To determine if changes in CV/IB are present in all LV walls and reflect regional and global structural changes within the myocardium, CV/IB was measured from LX, apical 4- (4C) and 2-chamber (2C) views in 26 DCM pts (mean age 58 ± 9 ys; ejection fraction 29 ± 10%) and compared to 30 age-matched normals (N). Using a 2D acquisition, CV/IB was measured from 16 regions-of-interest (ROI) within the LV: basal (B) and mid (M) segments from LX and B, M and apical segments from 4C and 2C views. CV/IB was present in 100% ROIs in N and in 87% in DCM. The mean value of CV/IB, averaged from all ROIs in DCM was significantly reduced compared to N (3 ± 2.5 dB vs 5 ± 2.9 dB, $p < 0.0001$). The N group demonstrated marked regional variability in the magnitude of CV/IB. Although DCM patients had globally hypocontractile LV's, CV/IB was not equally reduced in all ROIs. The ROIs located within the M-IVS, M- and apical-inferior wall did not demonstrate any significant difference when compared to N. This may be related to the heterogeneous pattern of the histopathological changes of the myocardium in DCM. These findings indicate that a multi-view approach to record CV/IB can be used to differentiate normal from myopathic myocardium and can quantify regional differences in myocardial contractile performance of the LV.

905-14 The Assessment of Systemic Vascular Compliance During Cardiac Output Measurement to Evaluate Cardiovascular Loading Status

Wei-Chih Hu, Tsui-Lieh Hsu, Todd Brinton, Li-Ching Tai, Shiu-Shin Chio, Shih-Pu Wang, Mau-Song Chang, Chun-Peng Liu. *Veterans General Hospital-Taipei, Taiwan, R.O.C.*

Systemic vascular compliance (SVC), dV/dP, is an important index of cardiovascular loading status. SVC was determined using cardiac output (CO) derived by thermo-dilution and non-invasive pulse pressure (PP) and heart rate (HR) measurement obtained by a new oscillometric technology, [SVC = CO/(PP*HR)]. SVC measurement obtained by this method were compared to the effective arterial elastance (Ea) obtained by micro-manometer tipped catheter in 30 myocardial infarction (MI) and 20 control patients. By definition, SVC corresponds inversely to Ea which was determined by the ratio of left ventricle developed pressure to stroke volume. A good correlation (r = 0.85) was observed between SVC and 1/Ea (top figure). In order to evaluate the relationship between blood pressure load and cardiovascular loading status, SVC was compared to mean arterial pressure (MAP) in both MI and control patients. The relation between SVC and MAP is best fitted with a second order polynomial (r = 0.77) and the data of both groups follows the same fitting function (lower figure).



The results suggest that SVC can be accurately assessed during cardiac output measurement utilizing a new non-invasive blood pressure and heart rate technology and results are not significantly affected by disease state.

906 Cardiomyopathy

Monday, March 25, 1996, Noon–2:00 p.m.
Orange County Convention Center, Hall E
Presentation Hour: 1:00 p.m.–2:00 p.m.

906-45 Prevalence of Left Ventricular Dysfunction in Female Carriers of Duchenne and Becker Muscular Dystrophy

Annette C. Brauns, Edo M. Hoogerwaard, Egbert Bakker, Arthur A. Wilde, Marianne de Visser, Poll A. van der Wouw. *Academic Medical Centre, Amsterdam, The Netherlands; University of Leiden, Leiden, The Netherlands*

Introduction: Several reports have stated cardiac involvement in possible female carriers of Duchenne (DMD) and Becker (BMD) muscular dystrophy. As carriers can now be positively identified by DNA analysis it has become possible to study LV function in DNA-proven and obligatory D/BMD carriers.

Methods: BMD and DMD carriers in the age of 18–60 years, registered at the dept. of Human Genetics in Leiden were invited to participate in the study. Carrier status was established by pedigree or DNA analysis. Women with hypertension, coronary disease, valve dysfunction, or severe co-morbidity were excluded. Left ventricular (LV) function and wall motion was assessed by M-mode and 2-D transthoracic echocardiography.

MONDAY POSTER